CBT/E-LEARNING/MULTIMEDIA

Value through human and technology

New instructional technologies are enabling learning anytime and any place. Content is becoming more sophisticated and courses more user friendly but the instructor remains vital. *MT&SN's Grant McDonald* investigates.

The computer literacy of tomorrow's warfighters will be exceptional. To help them in their mission and harness this literacy, Computer Based Training (CBT), e-learning and multimedia instructional techniques will become even more prevalent than they are today. Indeed, today's generation of young service personnel already demonstrate unparalleled Information Technology (IT) fluency. Moreover, they expect a degree of training to be delivered as standard via computers.

Militaries across the world are implementing strategies to meet not just this desire but also to reap the benefits CBT can deliver. In theory, at least, these can include better knowledge and skills retention and an overall better trained soldier from an integrated training continuum.

For example in Germany, a company called Ray Sono has designed a Windows XP-based CBT package using Macromedia authoring tools. Klaus Bock-Mueller is Managing Partner for Ray Sono's Training and Simulation department.

"This learning software is designed for the training of Germany Navy divers. The modular design consists of the following basic components: CBT Fundamentals "Underwater Explosive Ordnance," VR CBT "Explorative Navigation," VR CBT "Mission in the VR Environment" and a Mine Data Base."

"The fundamentals are taught in guided individual lessons. Afterwards, the learner can review the individual mines in detail using interactive VR models in order to prepare explosive ordnance recognition missions. The adopted knowledge can be applied in the subsequent diving missions in a VR environment."

"The trainer uses the training management system to set up each individual training mission to match any desired scenario and level of difficulty, for example by configuring mines in different weather conditions and in different ranges of underwater vision," says Bock-Mueller.

The Swiss Army uses Interactive Training Boards for training AFV maintenance technicians.
(Source: Inovex)

GROWING PRESENCE

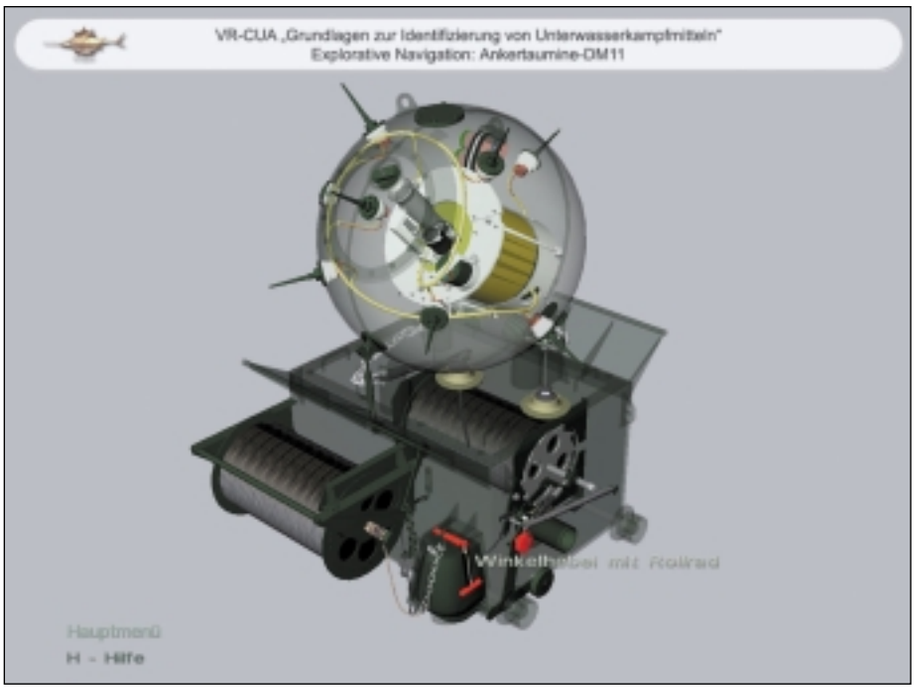
CBT is one example of technology in the classroom, which VEGA Group excel at. Another specialist, AdVal Learning Solutions (ALS), recently won a contract to train military users and maintainers of a new bomb disposal system. The company is to provide a five day training course for Abrasive Cutting Equipment (ACE) operators and maintainers using PowerPoint presentation materials and video to cover set-up and operating procedures.

"Our Training Needs Analysis (TNA) ensured that all aspects of the equipment's use and maintenance had been clearly identified so that a really cost-effective and appropriate training solution for ACE could be implemented," says ALS' Managing Director Peter Bonfield.

For the RAF, Epic Group has been developing basic map reading and first aid courses. Donald Clark is the company's CEO. "We've also been working for the Royal Military Police (RMP) on stop and search techniques where you can really make a cock up but it's important to do this first in a safe environment!"

"This training uses interactive video and complicated branching techniques."

The course can be delivered online or across a network or simply put on a CD-ROM. This format can be used to deliver Interactive Electronic Technical Manual



German company, Ray Sono has designed a Windows XP-based CBT package using Macromedia authoring tools.
(Source: Ray Sono)

(IETM) type solutions using Adobe Acrobat but they can also be hosted on laptops.

A new instructor-led blended learning programme is being delivered for Swiss Army maintenance personnel of the Spz 2000 (CV 90-30) Armoured Infantry Fighting Vehicle (AIFV). Using Interactive Training Boards (ITB), students are being taught training modules on electro-mechanical fault diagnostics and repair. Both the ITB and modules were supplied by INOVEX.

In addition, concepts like Computer Aided Instruction (CAI) allow an instructor to impart knowledge more easily with dynamic complex system animations. The Aviation Training International Limited (ATIL) Apache training facility at Middle Wallop and AgustaWestland's training solution for the British Army's BOWMAN digital communication system are other examples.

By mid-2007, AgustaWestland will have trained over 73,000 British Forces personnel in BOWMAN. The company's Interactive Electronic Training Delivery System using e-learning and simulation is delivered across up to thirty workstations per classroom, all linked by a Local Area Network (LAN) or Wide Area Network (WAN) as appropriate.

Across the UK Armed Forces and Ministry of Defence (MoD), a new e-learning programme called the Defence Learning Portal (DLP) is launching and is led by Wing Commander Iain Harrison of the Defence Centre of Training Support at RAF Halton. "The overarching aim of DLP is to put in place over the course of the next five to ten years a single MoD Learning Management System (LMS)."

"We're mandating the use of the DLP for all new web-based e-learning and alongside that, to migrate existing e-learning into the portal and switch off existing LMSs and contracts where it's feasible to do so."

"BT are responsible for the technical solution and provide us with an LMS, as well as a Learning Content Management System (LCMS) and support services to enable DLP enterprise wide across MoD and to support training across the world at the time of the individual's choosing at the location they're sent to."

DLP is forecasted to have 200,000 MoD users, both military and civilian, by 2010, although it will have a potential user capacity of 300,000 by 2007. Although the portal will probably reduce residential training, "DLP is part of an overall training strategy and not something that seeks to replace traditional training," stresses Wg Cmdr Harrison.

"Once the learner is registered they will do courses and when they are faced with a tasking that requires knowledge gained on a past training course they can dive into the LMS and pull out the course modules for refresher training."

The first phase of the LMS has been delivered as *MT&SN* goes to press. DLP is designed to be an incremental capability as Wg Cmdr Harrison explains: "it's very much a policy of grow it slow, grow it right. There's always a

The modern CBT/CAI classroom. This one is at the ATIL facility at Middle Wallop, UK.

(Source: ATIL)

danger of going for a big bang approach and it falling flat on its face. This is not going to be an overnight success but we have to take a 5-10 year view and work with all the different training providers and the MoD."

"The challenge we have is the implementation of all the business transformation that's necessary to support the adoption of new technology. It's one thing to get the technology in place, but BT are also helping us with the business transformation where we need to have the right skills, resources, competencies in place to support MoD's ability to exploit DLP," says Harrison.

"We are developing the course titles and grow that user population against that mandated courseware, rather putting everyone on the system and have them say there's nothing for me and never come back."

"We've put in excess of $8 million into e-learning courseware over the past two years to make sure we have got sufficient course titles on the DLP when we go live. Those are going to be integrated into the platform over the next 18 months."

Unclassified courses, it is anticipated, will be available from October over the internet. In time, classified/restricted courses will be available too but not over the internet. "BT have put in place the technical solution in accordance with MoD security accreditation security policies as they have the capacity and technical skills to meet those stringent security concerns," says Wg Cmdr Harrison.

The Defence Information Infrastructure (DII) is not as comprehensively advanced yet to meet DLP needs. "The DLP will not replace or seek to deliver high simulations but students could launch an application hosted on a local server. It is called edge networking where we can reduce the need for bespoke LMS but still deliver the advanced training necessary to the user," says Wg Cmdr Harrison.

Expected DLP benefits include the increased accessibility of training, particularly for support to deployed operations; support for the rationalisation of training establishments under the Defence Training Review Transformation; the more effective co-ordination of training through re-use of learning objects. DLP will use Shareable Content Object Resource Management (SCORM) version 1.2.

It is expected that in time the LCMS will provide facility to share course material both internally and with external companies, as re-usable learning objects, saving development time and production costs. There is an opportunity in the future to extend DLP to defence industry partners.

One such company that also bid for the DLP is LogicaCMG - Training. "We provide an LMS in the Defence Electronic Learning Centres (DELC) service but we will swap in 2007 to the DLP one if it's working by then. We're amazed that it's not functioning yet and a ramp up of DELC could have done it for about a 10th of the price," says the company's Business Development Manager John Bruce who is also critical of the slow implementation phase. LogicCMG has previously established 32 DELCs for the UK MoD.

"We also have to support deployed forces anywhere in the world. We provide Rapid Reaction DELC laptops with an LMS. You can start a course in Iraq and finish it in London. We are doing a trial with SATCOM link Skynet for the Rapid Reaction DELCs so results would be online. Also, upgrading DELC to a classified system is the next stage," says Bruce.

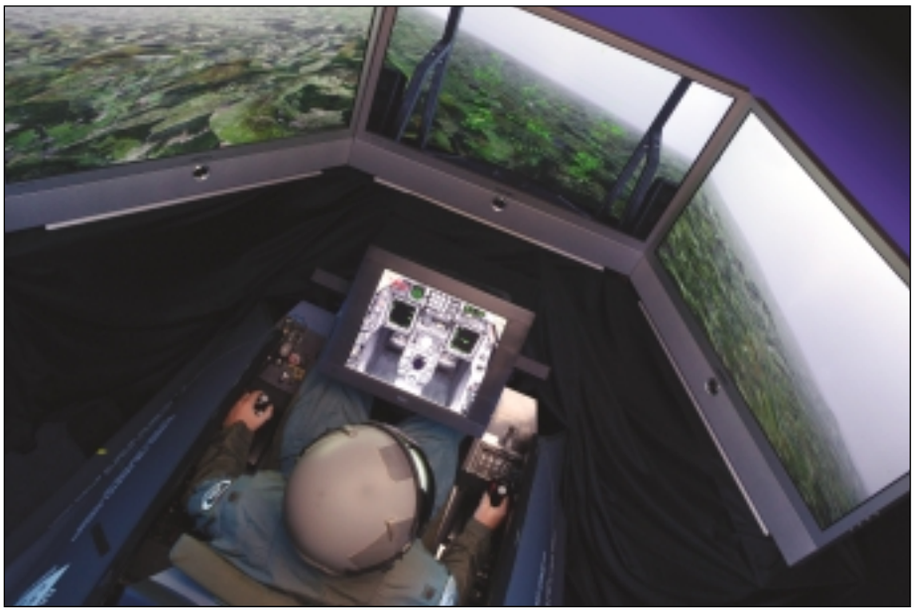
"Our innovative proposal was to centrally host the infrastructure consisting of a courseware and LMS server and a web server," says Bruce. The DELC deliver a wide range of courses covering civil servants core competencies, languages, MoD induction courses among others.

SCORM STORM

SCORM is changing how courseware content is developed not just in the UK but worldwide and originates with the Advanced Distributed Learning (ADL) Initiative established by the US Department of Defense (DoD) with a $60 million budget.

Paul Jesukiewicz is Director of the ADL Alexandria Co-Laboratory (Co-Lab), one of four facilities and says, "SCORM gives you interoperability and re-use without being tied to one specific tool."

A company called RUSTICI has developed an LMS plug-in to work with non-SCORM standard content. While SCORM does have its detractors, the standard has been widely adopted across the world.



NxTRAIN brings together the skills of LM STS and Simigon. NxTRAIN provides training on base, on deployment or even at home.

(Source: LM STS)

Non-US SCORM adopters recently joined their American brethren at the ADL Alexandria Co-Lab hosted Plugfest 9 whose purpose, Dr Robert Wisher, ADL Initiative Director explains. "Plugfest 9 brought together learning software developers and content providers from government, industry and academia to refine SCORM and associated practices, procedures and standards." OutStart was one of two companies which had their LMS SCORM 2004 certified.

Jesukiewicz discusses one of Plugfest lesson; "as we migrate [SCORM] specifications to international standards like Institute of Electrical and Electronics Engineers (IEEE)…the question is should we wait until everything is completed with the full accreditation IEEE or do we push it out sooner?"

Dr Wisher says, "we coincide Plugfests with technical milestones in our interoperability standards. We released SCORM 2004 in January last year and wanted to give vendors a time to catch up. The primary purpose was a shakeout of SCORM 2004 to be sure everything was working as we had planned it too."

Jesukiewicz says, "we were surprised that there were a lot of tools and innovation in our plug and play rooms. Taiwan has developed a tool called pocket SCORM and they can capture content, content objects and video and take that down to a cell-phone. The other thing we saw was one of the vendors has a tool that can export PowerPoint right into SCORM." Integration into technical data, integrating with simulation and other environments were two other SCORM themes.

Steve Sloer is a Senior Software Engineer at the Joint ADL Co-lab in Orlando. "One tool was developed by Mississippi University that…[allows you to]…draw your sequencing rules for your SCOs and see the organisation of your content package," says Sloer.

In addition to an executive briefing session involving senior DoD community figures, Plugfest 9 also hosted a SCORM workshop on sequencing and navigation co-sponsored by IEEE. Dr Wisher says, "we think sequencing and navigation will add a tremendous feature set and improve learning outcomes greatly and we intend to track that very closely."

"Rather than a follow a fixed sequence of going through learning modules, sequencing and navigation allows you to branch to another learning module based on your profile, your history with other lessons and what your individual requirements are. It makes possible many learning paths that would better suit an individual."

For his part Jesukiewicz tells *MT&SN*, "it gives you instructional capability that you don't see on the web today. You can do more robust instructional strategies so a learner can come into a course and do a pre-assessment and based on that follow perhaps the 40% he doesn't know." Sequencing will go through the process after a year of adoption by SCORM users.

Over at LMSTS, Fred Madsen, Manager of Training System Engineering says, "ultimately, we're heading in this direction but I don't think most of the industry is there yet is to allow students to do pre-assessments and have intelligent systems that allow you to tailor the learning environment to the student."

CAE's Simfinity was developed for the airline market but is now used by the military.

(Source: CAE)

NEW PLATFORMS

For the Joint Strike Fighter (JSF) programme, Lockheed Martin is providing a "highly interactive human performance support system." Madsen says, "the Integrated Learning Environment (ILE) provided by NxTrain has the ability to create SCORM conformant courseware and import other products from other companies. For example on JSF, Northrop Grumman will be producing SCORM conformant courseware."

"We're at the design analysis phase, but including all the content for other JSF nations, it will be a fairly significant number of training hours," says Madsen.

NxTrain based solutions are also part of LMSTS' contribution to bids for the $19 billion Military Flying Training System (MFTS) and the Maritime Composite Training System (MCTS).

ADL is also working on the Content Object Repository and Development Registration Architecture (CORDRA) which is "the next big thing." The first instance of CORDRA is the ADL registry where all DoD content being developed must be registered.

Jesukiewicz says, "we are creating a framework reference model approach just like we did with SCORM. Today it's difficult for someone to tell you what content they have, where it is, how to search and find it or if it's within someone's hard drive. With the CORDRA approach, you'll be able to find something that already exists before you start to develop something, if it's based on SCORM you take the objects you need and customise the rest."

The Orlando Joint ADL Co-lab where Jean Burmester is Director also provides course creation services, in addition to core ADL work. "We have a few projects where we create the end product, for example, for the Defense Nuclear Weapons School (DNWS) we studied how you convert their existing instructor based course for web-based training."

Existing courseware is also being converted into SCORM by companies such as LMSTS. "We have thousands of hours of legacy courseware such as in our USAF Special Operations Forces training programme and we are in the process of converting it into a SCORM compliant format.

This is a challenge to convert, but we have built an automated tool to convert into SCORM 2004. We have not wrestled as an industry with the design of the learning content to maximise reusability across all of our programmes," says Madsen at LMSTS.

Another avenue of ADL development focuses on online gaming. Dr Wisher says, "We're just beginning to look at multiplayer online games and how that would tie into the ADL SCORM framework, how a game would talk to a SCORM LMS."

"We want to create these universal immersive learning environments and not limit the view of ADL and SCORM that's where it just begins."

One of the visions of ADL is anytime, anywhere training by porting training to smaller devices such as hand-held computers and Personal Data Assistants (PDA). LMSTS announced last year at I/ITSEC it had teamed with SimiGon Ltd. to incorporate SimiGon's KnowBook technology into NxTrain, which "enables individual or distributed training across a full spectrum of training devices, and offers an integrated LMS on the PC platform."

"Distributed training solutions represent the future of the industry," said Amos Vizer, President and CEO of SimiGon. "Combining technologies, we will offer a truly comprehensive training environment, linking simulation systems in a single, all-in-one environment with simulation, analysis, reporting, mission rehearsal, scheduling and management systems."

Equally, Simfinity a CAE product can be installed on a laptop for deployed training. This was the case for the German Army which had Simfinity re-hosted so CH-53 aircrew could do Electronic Warfare (EW) training during deployments. One snowballing issue is the cost of the proprietary data needed for CBT simulations as aircraft manufacturers are said to be raising prices.

The train anywhere vision is also shared in part by the $83 million Joint Knowledge Development and Distribution Capability (JKDDC) programme which is transitioning 28 SCORM conformant courses online, including Senior Non-commissioned Officer, Standing Joint Task Force Headquarters and Joint Anti-Terrorism. SAIC is the JKDDC prime contractor.

Dr Jerry West JKDDC Deputy Director tells *MT&SN*, "when we talk about truly transforming the way we do education and training for the joint warfighter, that's a strategic focus because we're not going to get there overnight."

JKDDC is expected to mature from 2009 and every requirement it meets originally stems from Joint Forces Command. While JKDDC provides for individual knowledge provision including training, be it Washington DC or Baghdad, the Joint National Training Capability (JNTC) provides unit training and above.

"This first phase [until 2009] is like building infrastructure, pulling the content together. We now use a joint training system to go and capture learning experiences and put it in the joint training system and have the Combat Commands (COCOM) assess readiness levels."

The key JKDDC watchwords for industry are interoperability, open architectures, network centric warfare, web-based simulation and intelligent agents to discover learning objects content so a course or performance support can be provided by JKDDC.

Dr West outlines some of the challenges in the future: "JKDDC can't build all the knowledge and network. We have to demonstrate how it's to be done, build the standards and then empower our stake-holders to be able to do it. We need compacted simulations so you can build them into instruction."

In conclusion, instructional media be it CBT or e-learning, continue to expose outdated instructional techniques that fail to address the complexity of modern military systems, both platforms and how the soldier operates in the age of network centric warfare or Network Enabled Capabilities (NEC).

Nevertheless, the instructor still makes a decisive contribution whose value cannot be accurately calculated by accountants nor dismissed.